

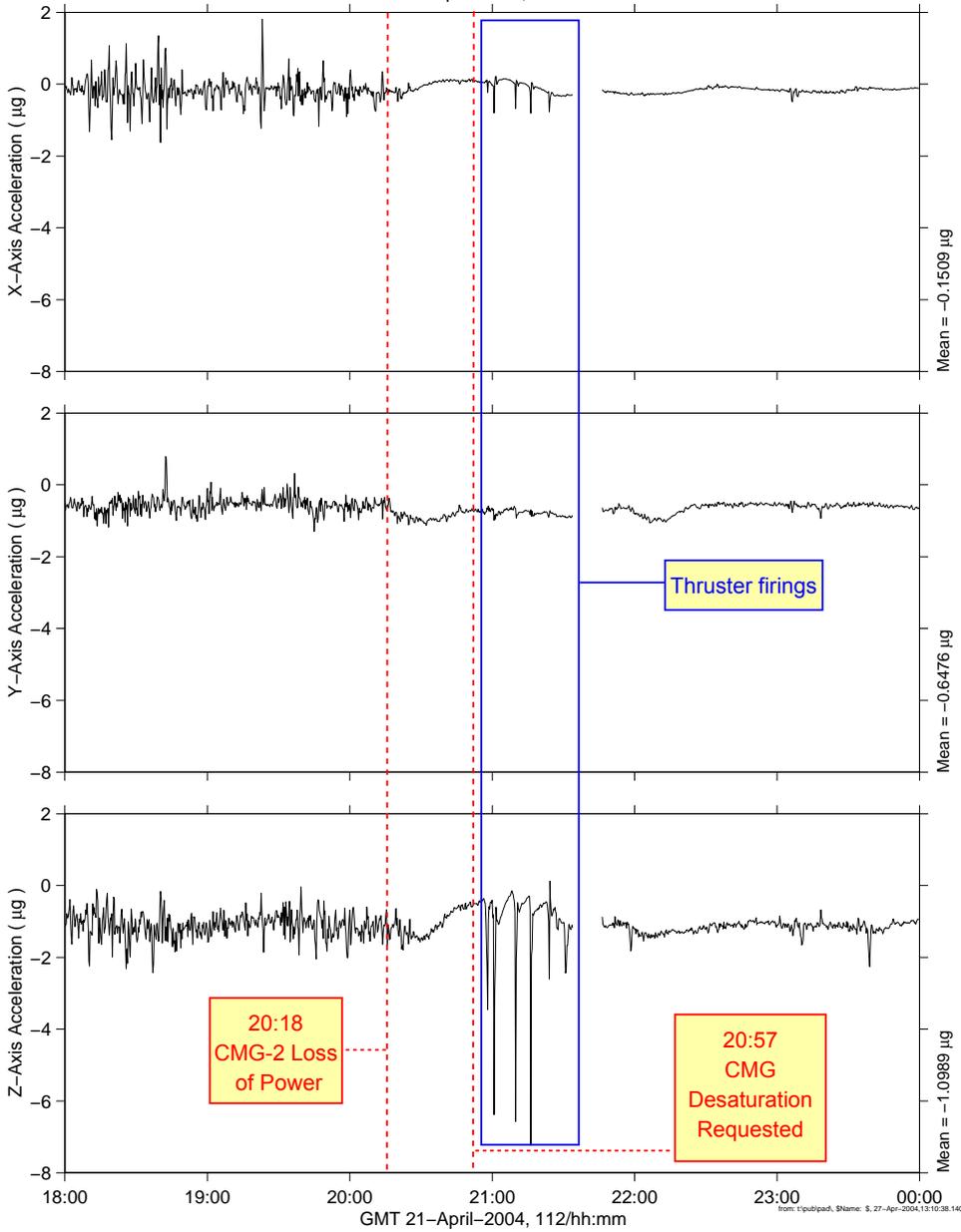
Control Moment Gyroscope 2 (CMG-2) Shutdown

mams, ossbtmf at LAB1O2, ER1, Lockers 3,4,[135.28 -10.68 132.12]
0.0625 sa/sec (0.01 Hz)

Increment: 8, Flight: 7S
SSAnalysis[0.0 0.0 0.0]

Loss of Attitude Control due to CMG-2 Shut Down

Start GMT 21-April-2004, 112/18:00:01.531



Description

Sensor	MAMS,ossbtmf 0.0625 sa/sec (0.01 Hz)
Location	LAB1O2, ER1, Lockers 3,4
Orientation	Space Station Analysis (SSA)
Inc/Flight	Increment: 8, Flight: 7S
Plot Type	Time Series

NOTES:

- At GMT 21-April-2004, 112/20:18, Control Moment Gyroscope 2 (CMG-2) lost power and spun down due to a tripped Remote Power Control Module (RPCM).
- The ISS was in +XVV/+ZLV Torque Equilibrium Attitude when the shutdown occurred. The variation seen in the baseline in all three axes between 20:30 and 21:40 is due to the drift away from normal LVLH attitude while the ISS was under Loss of Attitude Control (LoAC).
- At 20:57, momentum in the remaining CMG's climbed to 87%, and desaturation by thruster firings was requested. These appear in the plot as 4 to 8 μg peaks in the -Z axis and about 1 μg peaks in the -X axis.



Microgravity Science Division



Glenn Research Center

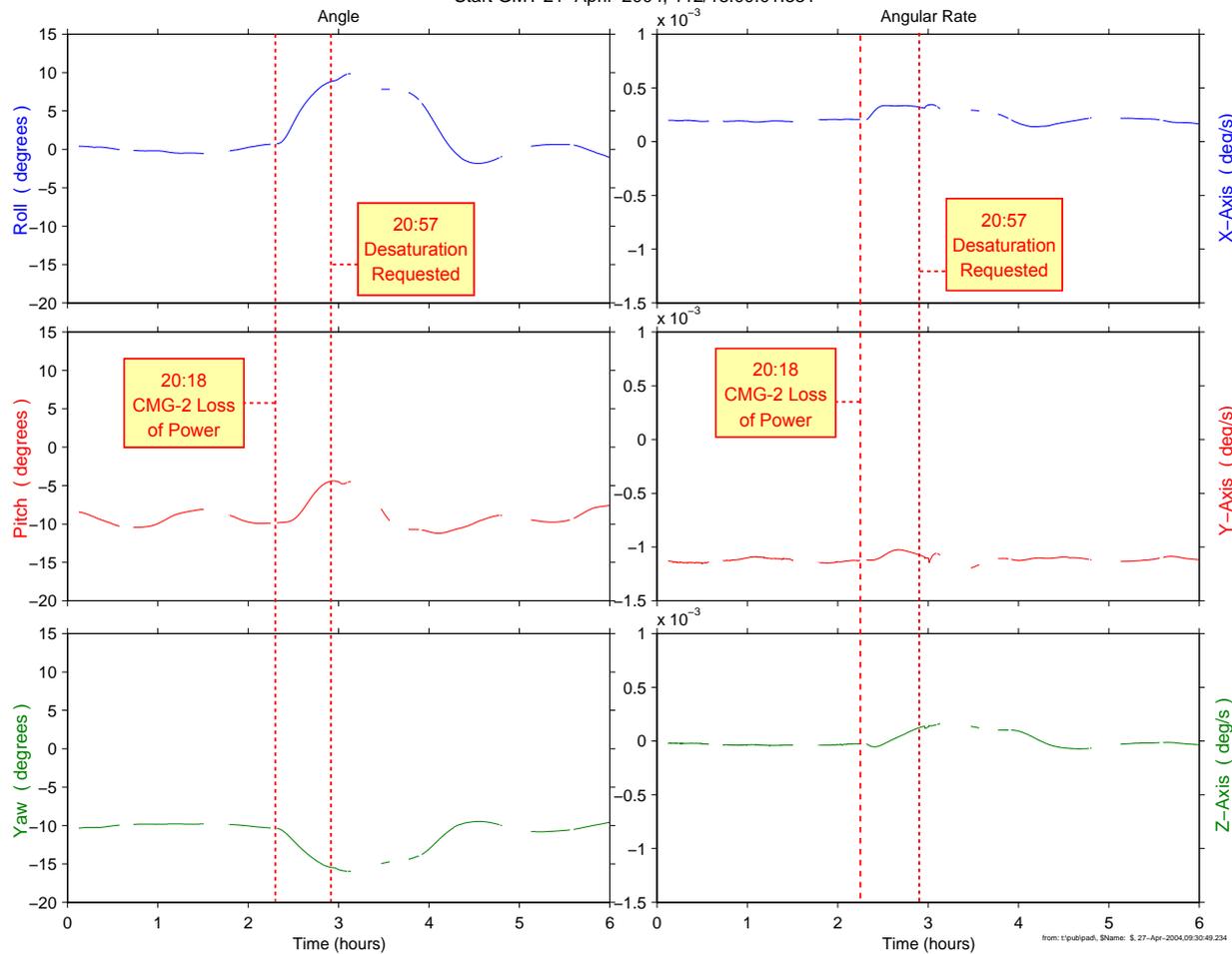
Regime:	Quasi-steady
Category:	Vehicle
Source:	CMG

Control Moment Gyroscope 2 (CMG-2) Shutdown

iss_rad, radgse at LAB102, ER1, Lockers 3,4 [135.28 -10.68 132.12]
0.0625 sa/sec (1.00 Hz)

ISS Rates and Angles After CMG-2 Shutdown
Start GMT 21-April-2004, 112/18:00:01.531

Increment: 8, Flight: 7S
SSAnalysis



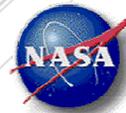
Description	
Sensor	ISS Telemetry, radgse 0.0625 sa/sec
Location	LAB102, ER1, Lockers 3,4
Orientation	Space Station Analysis (SSA)
Inc/Flight	Increment: 8, Flight: 7S
Plot Type	Acceleration Magnitude

NOTES:

- Plots shown are the attitude angles (left column) and rotational rates (right column) for the time period surrounding the CMG-2 shutdown event.
- After the shutdown (designated by red dotted line at 2.3 hours), the ISS enters LoAC and drifts from nominal attitude by 5-10 degrees per axis. Small variations in angular rates can also be seen at this time.
- ISS telemetry data plotted is from MAMS real-time GSE Packet. Angles are Yaw, Pitch, Roll sequence relative to LVLH attitude. Rates are for Space Station Analysis X, Y, and Z relative to J2000.



Microgravity Science Division



Glenn Research Center

PIMS ISS Acceleration Handbook
Date last modified 4/29/2004

Regime:	Quasi-steady
Category:	Vehicle
Source:	CMG

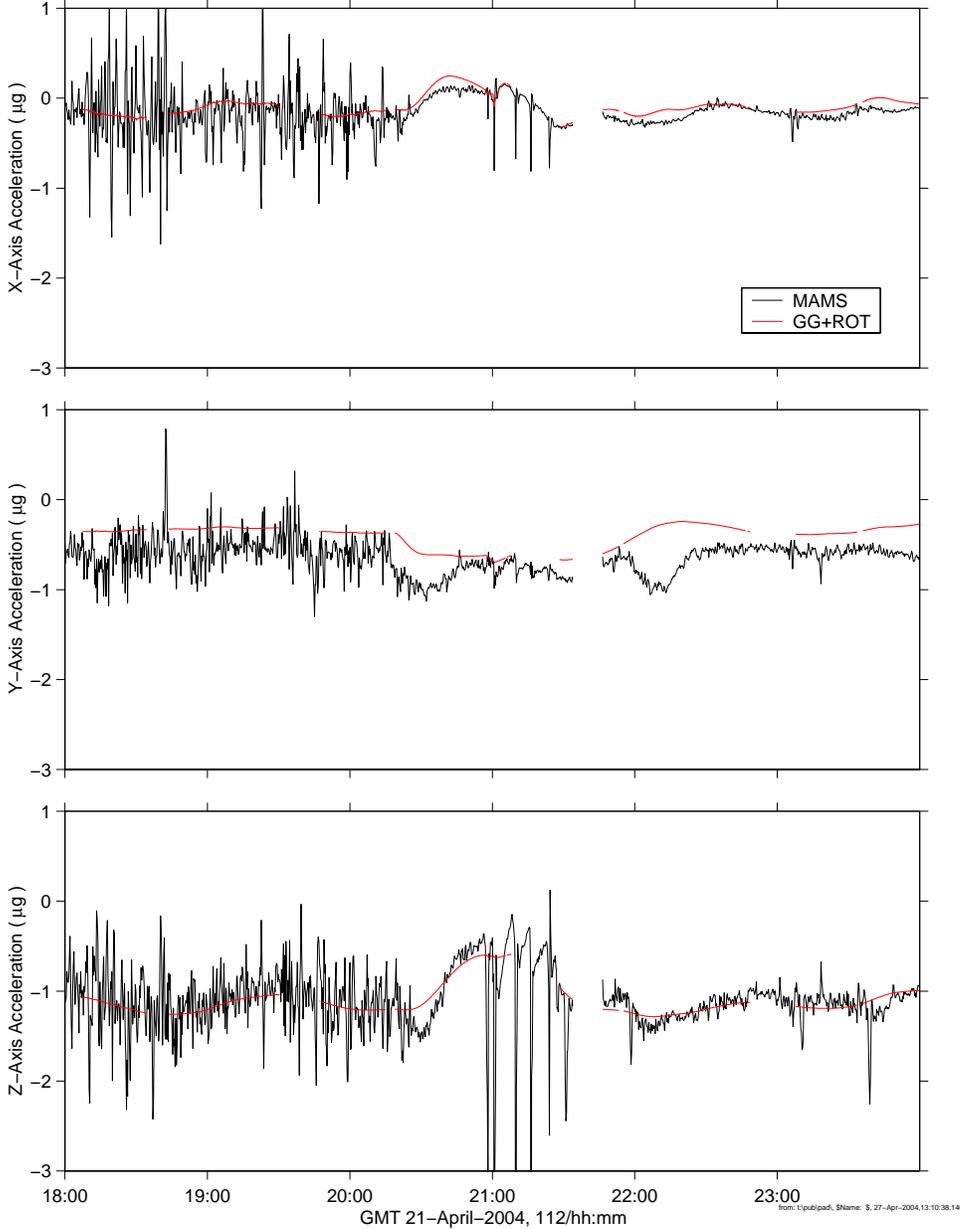
Control Moment Gyroscope 2 (CMG-2) Shutdown

mams, ossbtmf at LAB1O2, ER1, Lockers 3,4:[135.28 -10.68 132.12]
0.0625 sa/sec (0.01 Hz)

Increment: 8, Flight: 7S
SSAnalysis[0.0 0.0 0.0]

Loss of Attitude Control due to CMG-2 Shut Down
Gravity Gradient + Rotational Components Overlay

Start GMT 21-April-2004, 112/18:00:01.531



Description

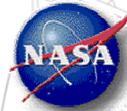
Sensor	MAMS,ossbtmf 0.0625 sa/sec (0.01 Hz)
Location	LAB1O2, ER1, Lockers 3,4
Orientation	Space Station Analysis (SSA)
Inc/Flight	Increment: 8, Flight: 7S
Plot Type	Time Series

NOTES:

- The plot on the left shows the quasi-steady profile as measured by MAMS (black line) overlaid with gravity gradient + rotational components (red line) calculated using ISS Rates and angles telemetry data (see previous page).
- Close agreement between MAMS and the ISS telemetry calculations indicate the majority of the disturbance during LoAC following the CMG-2 shutdown is due to drift away from nominal LVLH attitude.
- The approximately 0.3 μg discrepancy in the Y-axis is most likely due to an as yet unidentified phenomenon that is present when a 100 Hz signal is seen in SAMS data. This 100 Hz signal is confirmed present during the time period shown. See quasi-steady handbook page titled "Unknown Quasi-steady Y-axis Step" for more details.



Microgravity Science Division



Glenn Research Center

Regime:	Quasi-steady
Category:	Vehicle
Source:	CMG